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BUBLEYNIKOV, Feofan Dmitriyevich; GORSHKOV, G.P., professor, redaktor; [illegible], V.A., redaktor; TUMARKINA, N.A., tekhnicheskiy redaktor.

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BONCHKOVSKIY, V.F.; BUBLEYNIKOV, F.D.; ZISMAN, G.A., redaktor; NEGRIMOVSKAYA, R.A., tekhnicheskiy redaktor

[The earth, its figure and physical characteristics; present-day ideas regarding its historical development] Zemlia, ee figura i fizicheskie svoistva; sovremennye vzgliady v istoricheskom razvitii. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1956. 252 p. (MLRA 10:1)
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[Geological prospecting in Russia] Geologicheskie poiski v Rossii. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po geol. i okhrane nedr, 1956. 250 p. (MLRA 10:2)
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3(5) PHASE I BOOK EXPLOITATION SOV/1138

Bubleynikov, Feofan Dmitriyevich

Tayny zemli (Secrets of the Earth) Moscow, Moskovskiy rabochiy, 1958. 133 p. 35,000 copies printed.

Eds.: Shcherbakova, D.I., Academician, and Gringauz, S.; Tech. Ed.: Yegorova, I.

PURPOSE: The book is written mainly for the young reader.

COVERAGE: This is a popular account of the nature of physical geology, i.e., the origin of the Earth, land forms, formation of mineral deposits, etc. Particular attention is paid to the processes of mountain formation, sedimentation, and erosion including the effects of igneous activity and rock deformations. The author intimates that the book provides a popular explanation of all such processes which have hitherto been considered "great mysteries".

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Secrets of the Earth SOV/1138

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[James Clerk Maxwell, 1831-1879] Dzhems Klerk Maksvell, 1831-1879. Moskva, Izd-vo "Znanie," 1960. 47 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser.9, Fizika i khimiia, no.19). (MIRA 13:10)
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(MIRA 13:12)

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[Outline of the development of classical mechanics] Ocherk razvitiia klassicheskoi mekhaniki. Moskva, Gos. uchebno-pedagog. izd-vo M-va prosv. RSFSR, 1961. 221 p. (MIRA 14:11)
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LUBLEYNIKOV, F.D.

Life and work. Priroda 53 no.2:57-64 '64. (MIRA 17:2)

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Three-element oscillator regulated by a crystal. p. 121. (Strojnoelektrotechnicky Casopis. Bratislava, Vol 5, No. 2, 1954)

S): Monthly list of East European Accessions, (EEAL), LC Vol 4, No. 6, June 1955, Uncl

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SOURCE: East European Accessions List, (EEAL), Library of Congress Vol. 5, no. 12, December 1956.

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[Middle Cambrian trilobites of Kazakhstan] Srednekembriiskie trilobity Kazakhstana. Part I. [Boshchekul' faunal horizon] Boshchekul'skii faunisticheskii gorizont. Alma-Ata, Izd-vo AN KazSSR, 1953. 226 p. (MLRA 8:2)
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BUBLICHENKO, N.L., doktor geologo-mineralogicheskikh nauk.

M.A.Rzhonsnitskaia's work "Spiriferids of Devonian deposits on the margin of the Kuznetsk Basin." Vest.AN Kazakh SSR 11 no.10: 120-121 O '54. (MLRA 8:1)
(Rzhonsnitskaia, M.A.) (Kuznetsk Basin--Brachiopods, Fossil)

15-1957-3-2605

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 3, p 6 (USSR)

AUTHORS: Bublichenko, N. L., Nikitina, L. G.

TITLE: The Tarkhanskiy Section (Southwestern Altay) [Tarkhanskiy razrez (Yugo-Zapadnyy Altay)]

PERIODICAL: Tr. Altaysk. gorno-metallurg. n.-i. in-ta AN KazSSR, 1955, Vol 2, pp 5-25

ABSTRACT: The Devonian and Carboniferous section of the Emeinogorsko-Tarkhanskiy belt of southwestern Altay is described in detail (see Table). According to the author, the fossils in the Tarkhanskaya svita (series) are carboniferous, although Devonian forms are also present. The following Carboniferous forms are found in the lower part of the Tarkhanskaya series: Linoproductus aff. ovatus Hall., Plicatifera orthomasiis sp. n., Productus minax subgen and sp. n., and others. The Devonian forms present are Cyrtospirifer kureki Bubl. and Trlothyris massacostalis Hall. The upper boundary of the Tarkhanskaya series is determined by the disappearance of Cyrtospirifer kureki and the appearance of Spirifer tornacensis Kon.

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The Tarkhanskiy Section (Southwestern Altay) (Cont.)

The boundary between the Bukhtarminskaya and Ul'binskaya series is based on the abundant appearance of bryozoans in the Bukhtarminskaya series and the disappearance of other organisms. The Maloul'binskaya series is correlated with the Mazurovskaya series of the Kuzbas (Kuznetsk Basin) on the basis of plant remains. The Middle Devonian rocks of the Tarkhanskaya and Maloul'binskaya series are characterized by their transgressive relationships.

Namurian stage	Maloul'binskaya series. Continental sediments, consisting of siltstones with Angaropteridium cardiopteroides; up to 1000 m thick.
Visean stage	Ul'binskaya series. Siltstones and limestones with bryozoans Polypora sibirica, brachiopods Productus ex. gr. pinguis and others; 300-400 m thick.

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The Tarkhanskiy Section (Southwestern Altay) (Cont.)

TOURNAISIAN STAGE	TARKHANSKAYA SERIES	Bukhtarminskaya series. Limestones with Spirifer tornacensis and others; about 100 m thick. Tarkhanskaya subseries. Retoporinal beds, siltstones with Retoporina altaica and others, brachiopod layers, siltstones with Spirifer iulii and others; 580 m thick. Subseries of detrital shales. Yellowish-green siltstones 280 m thick. Subseries of sandstones. Interbedded coarse-grained sandstones and shales; remains of Linoproductus aff. ovatus, Cyrtospirifer kureki, and others; 28-29 m thick. Subseries of basal conglomerates. Pebbles formed from underlying volcanic rocks; up to 59 m thick.

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The Tarkhanskiy Section (Southwestern Altay) (Cont.)

Upper Devonian	Series of basic and intermediate volcanics. Augite porphyrites and their tuffs; 700 m thick. Series of acid volcanics with Nikolayevskiye beds at the base. Quartz keratophyres and their tuffs; limestones at the base with goniatites; 1200-1800 m thick.
Middle Devonian	Series of acid volcanics with Losishenskiye beds in the lower part and conglomerates at the base; 1300-2000 m thick.
Lower Silurian (?)	Metamorphic greenstones

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K. A. K.

BUBLICHENKO,N.L., doktor geologomineralogicheskikh nauk

Conference on problems of stratigraphy and geochronological classification. Vest.AN Kazakh.SSR 11 no.7:79-82 Jl'55. (Geology, Stratigraphic) (MLRA 8:10)

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(Altai Mountains--Corals, Fossil)

BUBLICHENKO, N.L.

Upper time limit of polymetallic mineralization in the Rudnyy Altai. Vest.AN Kazakh. SSR 12 no.10:101-103 O '56. (MLRA 9:12)
(Altai Mountains--Mineralogy)

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RUBLICHENKO, N.L.

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DUBLICHENKO, N.I.

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(Altai Mountains--Geology, Stratigraphic)

BUBLICHENKO, N.L.

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[Resolutions of the Conference on the Unification of Stratigraphic Charts of the Pre-Paleozoic and Paleozoic of Eastern Kazakhstan] Rezolyutsiia po unifikatsii stratigraficheskikh skhem dopaleozoia i paleozoia vostochnogo Kazakhstana. Alma-Ata, Izd-vo Akad. nauk Kazakhskoi SSR, 1958. 36 p. (MIRA 11:12)

1. Soveshchaniye po unifikatsii stratigraficheskikh skhem dopaleozoya vostochnogo Kazakhstana. Alma-Ata, 1958. 2 Akademiya nauk Kazakhskoy SSR, predsedatel' soveshchaniya po unifikatsii stratigraficheskikh skhem dopaleozoya i paleozoya vostochnogo Kazakhstana (for Borukayev). 3. Zam.predsedatelya soveshchaniya po unifikatsii stratigraficheskikh skhem dopaleozoya i paleozoya vostochnogo Kazakhstana; Vsesoyuznyy nauchno-issledovatel'skiy geologicheskiy institut (for Borsuk). 4. Zam.predsedatelya soveshchaniya po unifikatsii stratigraficheskikh skhem dopaleozoya i paleozoya vostochnogo Kazakhstana; Geologicheskiy institut Akademii nauk SSSR (for Keller). 5. Ministerstvo geologii i okhrany nedr Kazakhskoy SSR (for Aytaliyev, Myagkov). 6. Moskovskiy gosudarstvennyy universitet im. M.V.

(Continued on next card)

BORUKAYEV, R.A.---(continued) Card 2.
Lomonosova (for Bogdanov). 7. Altayskiy gorno-metallurgicheskiy nauchno-issledovatel'skiy institut Akademii nauk Kazakhskoy SSR (for Bublichenko). 8. Institut geologicheskikh nauk Akademii nauk Kazakhskoy SSR (for Bykova, Galitskiy, Medoyev, Shlygin, Nikitin). 9. TSentral'no-Kazakhstanskoye geologicheskoye upravleniye (for Orlov). 10. Yuzhno-Kazakhstanskoye geologicheskoye upravleniye (for Rukavishnikova, Senkevich).
(Kazakhstan--Geology, Stratigraphic)

RADCHENKO, Margarita Iosifovna; NALIVKIN, D.V., akademik, glavnyy red.; BUBLICHENKO, N.L., doktor geol.-mineral.nauk, otv.red.; MEYBURG, N.F., doktor geol.-mineral.nauk, red.; VLASOVA, S.M., red.izd-va; KRYNOCHKINA, K.V., tekhn.red.

[Paleontological basis of the Paleozoic stratiography of the Rudnyy Altai] Paleontologicheskoe obosnovanie stratigrafii paleozoia Rudnogo Altaia. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po geol. i okhrane nedr. No.8. [Plant remains of the Carboniferous of the Rudnyy Altai] Rastitel'nye ostatki karbona Rudnogo Altaia. 1958. 54 p. (MIRA 12:4)
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Fiftieth anniversary of the death of G.G.Fetts, geologist and paleontologist, the eminent explorer of the Altai. Izv.AN Kazakh.SSR.Ser.geol. no.4:114 '58. (MIRA 12:4)
(Fetts, G.G., -1908)

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(Prague--Geology, Stratigraphic--Congresses)

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Sixtieth birthday of Academician Kanysh Imantaevich Satpaev. Vest. AN Kazakh. SSR 15 no.4:58-61 Ap '59. (MIRA 12:7)
(Satpaev, Kanysh Imantaevich, 1899-)

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[Transactions of the conference on the unification of stratigraphic diagrams of the Pre-Paleozoic and Paleozoic in eastern Kazakhstan, Alma-Ata, May 12-17, 1958.] Trudy Soveshchaniya po unifikatsii stratigraficheskikh skhem dopaleozoya i paleozoya Vostochnogo Kazakhstana. Alma-Ata. Izd-vo Akad.nauk Kazakhskoi SSR. Vol.1. [Pre-Paleozoic, Cambrian, Ordovician, Silurian] Dopaleozoi, kembrii, ordovik, silur. 1960. 296 p. (MIRA 13:6)

1. Soveshchaniye po unifikatsii stratigraficheskikh skhem dopaleozoya i paleozoya Vostochnogo Kazakhstana. Alma-Ata, 1958. 2. Predsedatel' Orgkomiteta stratigraficheskogo soveshchaniya; AN KazSSR; Institut geologicheskikh nauk AN KazSSR (for Borukayev). 3. Institut geologicheskikh nauk AN KazSSR (for Nikitin). 4. Yuzhno-Kazakhstanskoye geologicheskoye upravleniye (for Rukavishnikova).
(Kazakhstan--Geology, Stratigraphic)

BORUKAYEV, R.A., otv.red.; AYTALIYEV, Zh.A., red.; BUBLICHENKO, N.L., red.; BYKOVA, M.S., red.; GALITSKIY, V.V., red.; MEDOYEV, O.TS., red.; NIKITIN, I.F., red.; RUKAVISHNIKOVA, T.B., red.; SENKEVICH, M.A., red.; SHLYGIN, Ye.D., red.; SEMENOV, M.N., red.; PROKHOROV, V.P., tekhn.red.

[Transactions of the Conference on the Unification of Stratigraphic Scales of the Pre-Paleozoic and Paleozoic in Eastern Kazakhstan. Alma-Ata, 1958] Trudy Soveshchaniia po unifikatsii stratigraficheskikh skhem dopaleozoia i paleozoia Vostochnogo Kazakhstana. Alma-Ata, Izd-vo Akad.nauk Kazakhskoi SSR. Vol.2. [Devonian, Carboniferous, Permian] Devon, karbon, perm'. 1960. 253 p. (MIRA 13:8)

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(Kazakhstan--Geology, Stratigraphic)

MAKSIMOVA, Klata Aleksandrovna; NALIVKIN, D.V., akademik, glavnyy red.; BUBLICHENKO, N.L., doktor geol.-mineral.nauk, otv.red.; BALASHOVA, Ye.A., kand.geol.-mineral.nauk, red.; ABKEVICH, P.L., red.izd-va; IVANOVA, A.G., tekhn.red.

[Paleontological basis of Paleozoic stratigraphy in the Rudnyy Altai] Paleontologicheskoe obosnovanie stratigrafii paleozoia Rudnogo Altaia. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po geol. i okhrane nedr. No.7. [Devonian and Carboniferous trilobites of the Rudnyy Altai] Devonskie i kamennougol'nye trilobity Rudnogo Altaia. 1960. (MIRA 13:12) 122 p.

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(Altai Mountains--Trilobites)

BUBLICHENKO, N.L., NOGOTSKAYA, L.N., FATKULIN, R.M.

Considering problems of geotectonic and the organic world. Vest.AN Kazakh.SSR 16 no.4:81 Ap '60. (MIRA 13:7)
(Geology, Structural) (Biology)

SPASSKIY, Nikolay Yaroslavovich; NALIVKIN, D.V., akademik, glav. red.; BUBLICHENKO, N.L., doktor geologo-mineral. nauk, otv. red.; BUL'VANKER, E.Z., kand. geologo-mineral. nauk, red.; ABKEVICH, P.L., red. izd-va; IVANOVA, A.G., tekhn. red.

[Paleontological basis of the Paleozoic stratigraphy in the Rudnyy Altai] Paleontologicheskoe obosnovanie stratigrafii paleozoia Rudnogo Altaia. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po geol. i okhrane nedr. No.3. [Devonian Tetracoralla in the Rudnyy Altay] Devonskie chetyrekhluchevye korally Rudnogo Altaia. 1960. 142 p. (MIRA 14:8)
(Altai Mountains--Rugosa)

BUBLICHENKO, N.L.

Stratigraphic control in metallogenic processes in the Rudnyy Altai. Trudy Alt. GMNII AN Kazakh. SSR 10:196-208 '61. (MIRA 14:9)
(Altai Mountains--Geology, Stratigraphic)

BUBLICHENKO, N.L.

Couvinian stage and some remarks about the Lower Devonian in general. Biul. MOIP Otd. geol. 36 no.1:76-88 Ja-F '61. (MIRA 14:5)

(Geology, Stratigraphic)

DUBATOV, Viktor Nikolayevich; BUBLICHENKO, N.L., red.; SOKOLOV, B.S., red.; IONINA, I.N., red. izd-va; VINOGRADOVA, N.F., tekhn. red.

[Tabulata and Heliolitidae in the Silurian and Devonian sediments of the Rudnyy Altai]Tabuliaty i geliolitidy siluriiskikh i devonskikh otlozhenii Rudnogo Altaia. Moskva, Akad.nauk SSSR, 1962. 109 p. 29 plates. (MIRA 15:8)

1. Chlen-korrespondent Akademii nauk Kazakhskoy SSR (for Bublichenko). 2. Chlen-korrespondent Akademii nauk SSSR (for Sokolov).

(Altai Mountains—Corals, Fossil)

BUBLICHENKO, N.L.

Methods for stratigraphic studies of the Rudnyy Altai. Trudy Alt.GMNII AN Kazakh.SSR 12:3-21 '62. (MIRA 15:8)
(Altai Mountains--Geology, Stratigraphic--Research)

BUBLICHENKO, N.L.; KOZHEMYAKO, M.N.

Tectofacies of flyschoids and their genesis in the southwestern Altai. Dokl. AN SSSR 152 no.4:931-933 O '63. (MIRA 16:11)

1. Gornometallurgicheskiy nauchno-issledovatel'skiy institut AN KazSSR. Predstavleno akademikom D.V. Nalivkinym.

BUBLICHENKO, N.L.; KOZHEMYAKO, M.N.

Facies and "flyschoids" in the southwestern Altai. Trudy Alt. GMNII AN Kazakh. SSR 16:3-14 '63. (MIRA 17:10)

PAULLER, O.F.; ASTRAKHANTSEVA, A.M.; BUBLIENKO, V.A.

Case of cat fleas attacking people in uninhabited rooms. Dokl. Irk. gos. nauch.-issl. protivochum. inst. no.5:177-179 '63
(MIRA 18:1)

BUBLIK, Andrey Ivanovich [Bublyk, A.I.], kand.tekhn.nauk; OBOLENSKIY, Yu.A., [Obolens'kyi, IU.A.], dotsent, red.; TUBOLEVA, M.V. [Tubolieva, M.V.], red.

[Water supply for stock farms] Vodopostachaniia tvarynnyts'kykh ferm. Kyiv, 1958. 39 p. (Tovarystvo dlia poshyrennia politychnykh i naukovykh znan' Ukrains'koi RSR. Ser.3, no.22) (MIRA 12:2)
(Water supply, Rural)

BUBLIK, A.I. [Bublyk, A.I.], dots.

Filter of porous concrete for dug wells. Mekh. sil'. hosp. 9 no.2:15-16 F '58. (MIRA 11:3)
(Filters and filtration)
(Wells)

BUBLIK, A. I.

USSR/Physics - Monochromatic X-ray Sources May/Jun 52

"Employment of the Sharp-Focus Tube for Operation in Impulse Regime," A. I. Bublik and B. Ya. Pines; Khar'kov State U imeni A. M. Gor'kiy

"Iz Ak Nauk SSSR, Ser Fiz" Vol 16, No 3, pp 350-354

Report heard at the conference on powerful monochromatic x-ray sources, held at Khar'kov 24-26 Jan 52. V. V. Avgust participated in this report. Subject operation is important

232T104

for investigating those processes of structural variations that occur in time. In this connection tubes with higher power or rotating or oscillating anodes were employed before the appearance of subject sharp-focus tubes (which permit shortening the time of exposure without increase of power). Now even better is subject impulse (rapid) x-ray tube.

232T104

USSR/Physics - Monochromatic X-ray Sources May/Jun 52

232T105

"An X-ray Tube With an Especially Long and Sharp Linear Focus and Some of Its Applications," A. I. Bublik, B. Ya. Pines; Khar'kov State U imeni A. M. Gor'kiy

"Iz Ak Nauk SSSR, Ser Fiz" Vol 16, No 3, pp 355-359

Length of focus is 22 mm and the distance from focus to tube's fovea is 12 mm, which permits use of x-ray beams with angular

232T105

convergence greater than 50°. This large convergence enables one successfully to photograph single-crystal samples according to the method of converging beam, the exposure being several times shorter than required to obtain x-ray photographs of rotation. Subject method is especially advantageous for photographing microcrystals, making it convenient for studying structure of alloys and metals.

232T105

USSR

"Phase transition in changing the thickness of thin metal films. A. I. Bublik and B. Ya. Pines (A. M. Gor'kii State Univ., Kharkov). *Doklady Akad. Nauk S.S.S.R.* 87, 215–18(1953).—In order to study the phase transitions between massive metals and their thin films, electron-diffraction studies were made with evapd. thin films of Be, V, Cr, Ni, and Co for a thickness range from 10^{-7} to 10^{-5} cm. The electron diffraction patterns show that the structure of the film depends on the rate of evapn. in formation of the film. For films of thickness ~10^{-7} lines are observed that are due to phases unstable at room temp. for massive samples (e.g., β-Be). The stability of such phases is discussed.

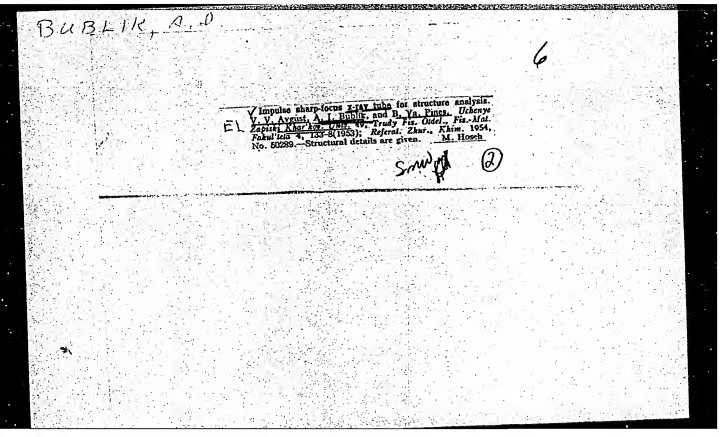
J. Reuter Leech

SU Lik, A. I., [illegible], S. Ya.

"X-Ray Tube With Particularly Long and Sharp Linear Focusing"
Uch Zap. Kharkovskogo Univ. 49, Tr. Fiz. Otd. Fiz. Mat fak., 4, 1953, pp 129-132

An X-ray tube with a focal spot 22 mm long and 0.3 mm wide is described. Electrostatic focusing of the electron beam formerly used for tubes with a focal point (cf. V. E. Lozverskiy and S Ya. Pines, Zh. Tekh. Fiziki, 17, (1947) was applied. Tests with crystals proved that the tube may serve as powerful monochromatic source for analysis of scattering of fluids and for radiograms of microcrystalline objects. (Referat Zhur Fiz, No 2, 1955)

SO: Sum. 402, 12 May 55



BUBLIK, A. D

6

EL Y Impulse sharp-focus X-ray tube for structure analysis. V. V. Ayvazi, A. I. Bublik, and B. Ya. Pines. *Uchenye Zapiski Khar'kov. Gos. Un. im. Gor'kogo, Trudy Fiz. Otdel., Fiz.-Mat. Fakul'teta* 4, 137-8(1953); *Referat. Zhur., Khim.* 1954, No. 50289.—Structural details are given. M. Hosch

S/W/ (2)

BUBLIK, A.I.

V Nonequilibrium states in thin films of metals and alloys. III. Electronographic study of thin cobalt films. A. I. Bublik, R. I. Vyrasulimova, and B. Ya. Pines. *Uchenye Zapiski Kharkov. Univ.* 49; *Trudy Fiz. Otdel. Fiz-Mat. Fakultcta* No. 4, 139–50(1953); cf. *C.A.* 49, 7040c.—CH Data are given for an electronographic study of free, thin Co films that were obtained by evapn. and condensation of the metal in vacuo. A structural change in the films was detd. in relation to the evapn. rate and thickness of the film. The thickness was measured by an optical-interference method. A disordered st. distribution was noted in films resulting from slow evapn. Interference max. were absent on the electronograms. With rapid evapn. (several secs.) there was a well-ordered distribution of atoms. Thus, in the cases of both V and Be (*ibid.* 39, No. 2, 75(1952)), the relation of structure to the thickness of the film is shown. In very thin films ($2 - 3 \times 10^{-7}$ cm.) Co occurs in an "amorphous" state. Two clearly defined diffusion rings are present on the electronogram. In films with a thickness of $\sim 10^{-6}$ cm. the structure of Co corresponds to the face-centered cubic). Hexagonal Co is observed in films that are thicker than 10^{-6} cm. In the thickness range from 4×10^{-7} to 8×10^{-7} cm. there are lines on the electronograms that do not correspond to the known Co modifications. IV. Structure of nickel and chromium in thin layers. Thermodynamic conditions for phase stability in thin films. A. I. Bublik and B. Ya. Pines. *Ibid.*—Data are given for an electronographic study of thin Ni and Cr films, obtained by evapg. the metal in vacuo. Just as with Co, in Ni and Cr films that are deposited by rapid evapn. there is a relation between the structure and the thickness. In films with a thickness of $>6 \times 10^{-7}$ cm. the same crystal structure is obtained as with massive samples. With thicknesses of ≤ 4–6×10^{-7} cm. another structure is observed; with Ni it is hexagonal and with Cr it is complex cubic similar to α-Mn. On the electronograms for films deposited by slow evapn. of the metal, the interference max. are enlarged. Thermodynamic conditions for phase equil. in thin layers are considered, and here the "crit. thickness" l^* is possible, before which modification 2 becomes stable. l^* is detd. by the relation: $l^* = (l_2 - l_1)/(F_1 - F_2)$ (1), where l_1 and l_2 are surface energies, F_1 and F_2 are "vol." free energies of the two phases. By taking into account the interaction between the nearest neighbors, equation 1 has the form: $l^* = d_0(1 - Z'/Z_1) - d_1(1 - Z'/Z_1) + \sigma_0(1 - Z'/Z_1)/\{[1 - (T/T^*)](2)$, where Z_1 and Z' are vol. and surface coördination quantities, d is the distance between at. layers parallel to the surface, ϵ is the relation of the latent heat of phase transition to heat of evapn., T^* is the temp. of phase transition for massive samples. According to a calcn. on the basis of equation 2, when the metal in a massive sample has a face-centered cubic lattice, the formation of a body-centered lattice in the thin film is very improbable. The reverse situation is very probable. The formation of a hexagonal lattice in the thin film is also possible, if the metal has a face-centered cubic lattice in the massive sample. Through *Referat. Zhur., Fiz.* 1955, No. 4775. Marjorie Kelley

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DUBLIK, A.I. and Pines, B.Ya.

"The Unbalanced State in Thin Films of Metals and Alloys," IV.

"The Structure of Nickel and Chrome in Thin Layers,"

"The Thermodynamic Conditions of Phase Stability in Thin Films,"
Uch. zap. KhGU. /Scientific notes of Khar'kov State University/ V. 48, Tr. Fiz. otd. /Works of the Physics Dept./ No. 4, Kh. State Univ. publication, 1953

Bublik, A.I.

USSR/Physics - Electronograph FD-1019

Card 1/1 : Pub. 153 - 23/24

Author : Pines, B. Ya., and Bublik, A. I.

Title : High-temperature electronographs

Periodical : Zhur. tekh. fiz., 24, 1139-1145, Jun 1954

Abstract : Describes a high-temperature electronograph of simple design (without magnetic lenses) for obtaining electronograms of specimens found at high-temperatures, in the form of thin plates and in the form of massive slides. The thin plates are of finely crystalline aluminum and other substances, practically single-crystals. Five references, all USSR (Z. G. Pinsker, B. K. Vaynshteyn, V. D. Bezverkhiy).

Institution : -

Submitted : July 19, 1954

BUBLIK, M.I.

I Electronographic examination of thin silver films. A. I. Bublik (A. M. Gorkii State Univ., Kharkov.) *Doklady Akad. Nauk S.S.S.R.* 95, 531-36(1954).—Films of less than 4.0×10^{-7} cm. thickness show, besides the cubic, face-centered unit cell ($a_0 = 4.08$ A.), distinct interferences of a hexagonal, more densely packed modification, with $a_0 = 2.88$ A., and $c_0 = 4.71$ A. Unstable films with this modification may even be prepd. up to 10×10^{-7} cm. thickness, but these are easily inverted to the stable cubic Ag form by heating. The rate of evapn. of the Ag in producing the films on a support of controlled temp. det. the intensity of the amorphous background of the electron interferences, and the variable distinctness of the lines in the electronograms. A "crit. thickness" is defined as a function of the surface tensions, and the free energies of the cubic and hexagonal modifications. This crit. datum is about 4 to 5×10^{-7} cm., in agreement with the electronographic results. W. Bird

BUBLIK, A.I.

"Electron Diffraction Study of Fine Silver Films," DAN SSSR, V. 96, No 3, AN (Academy of Sciences) USSR publication, M. - L. 1954.

BORLIK, A.I.

PINES, Boris Yakovlevich, professor; BURLIK, A.I., dotsent, kandidat fiziko-matematicheskikh nauk, otvetstvennyy redaktor; TRET'YAKOVA, A.N., redaktor izdatel'stva; TROFIMENKO, A.S., tekhnicheskiy redaktor

[Lectures on structural analysis] Lektsii po strukturnomu analizu. Izd. 2-oe, parer. Khar'kov, Izd-vo Khar'kovskogo gos.univ. im. A.M.Gor'kogo, 1957. 454 p. (MLRA 10:9)
(Crystallography)

BUBLIK, A.I.

AUTHOR: Bublik, A.I. 70-2-7/24

TITLE: Electronographic investigation of the structure of thin liquid layers of tin. (Elektronograficheskoye issledovaniye stroyeniya tonkikh zhidkikh plenok olova)

PERIODICAL: "Kristallografiya" (Crystallography), 1957, Vol.2, No.2, pp. 249-254 (U.S.S.R.)

ABSTRACT: Electronograms were obtained from liquid layers of Sn about 2-3 x 10^{-6} cm thick. The specimens were heated and the changes in diffraction pattern recorded. On approaching the m.p. the further outlines became broad and diffuse and then vanished altogether and at the m.p. itself there remained only a few broad low-angle rings. The latter coincided with the mean positions of groups of sharp lines in the powder photograph at room temperature. The radial distribution curve was calculated from the intensity data using the formula $4\pi R^2\rho(R) = 4\pi R^2\rho_0 + \frac{2R}{\pi}\int_0^{\infty} sJ_n(s)\sin sRds$ normally used for X-ray work. Here $\rho(R)$ is the atomic density function, ρ_0 the average density,

$$J_n(s) = J(s)/Nf^2 - 1,$$

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Electronographic investigation of the structure of thin liquid layers of tin. (Cont.)

$$s = \frac{4\pi \sin\vartheta}{\lambda} ,$$

$$f^2 = \frac{(Z - f_p^2)}{s^4} ,$$

Z being the atomic number and f_p the X-ray atomic scattering amplitude. J(s) represents the intensity of the coherent scattering, to obtain which the incoherent scattering has to be substracted from the observed intensity. The incoherent scattering is estimated from the very high angle scattering from the liquid and from the background between sharp lines from the crystalline specimen.

The resulting calculation gives the average surroundings of a Sn atom to be the following (compared with N.S. Gingrich, Usp. Khimiim 15, 297, 1946 - values bracketted).

Card 2/2

Electronographic investigation of the structure of thin liquid layers of tin. (Cont.) 70-2-7/24

Temp. °C.	First Co-ord. sphere. R Å	Number	Second R	Number	Third R	Number
20	3.05	4	3.78	4	4.42	8
	3.17	2			4.91	4
235	3.4	7	3.95	6	4.75	8
300	3.6	11.5				
(250	3.38	10)				
(390	3.36	8.9)				

These results are interpreted to mean that at the melting point the structure of Sn remains close to that of solid white Sn and with further heating the atoms tend to close packing (which is reached at about 300 C) and at higher temperatures the density of packing decreases. Acknowledgments to Prof. B.Ya. Pines.
There are 6 references, of which 5 are Slavic, 5 figures and 2 tables.

Card 3/3

ASSOCIATION: Kharkov State University im A.M. Gorkogo. (Kharkovskiy Gosudarstvennyy Universitet im A.M. Gorkogo)
SUBMITTED: June 30, 1956.
AVAILABLE: Library of Congress

BUBLIK, A.I.

AUTHOR: Bublik, A.I. and Buntar', A.G. 70-2-8/24

TITLE: The determination of the atomic radial distribution function in a liquid metal alloy from electronogram data. (Opredeleniye funktsii radial'nogo raspredeleniya atomov v zhidkom metallicheskom splave po dannym elektronogramm)

PERIODICAL: "Kristallografiya" (Crystallography), 1957, Vol.2, No.2, pp. 255-259 (U.S.S.R.)

ABSTRACT: The theory of a method for deriving the radial density distribution function from electron diffraction data is developed for the case where several kinds of atoms are present in a liquid alloy. The equation appropriate for X-ray scattering:

$$4\pi R^2\rho(R) = 4\pi R^2\rho_0 + \frac{2R}{\pi}\int_0^\infty s\left(\frac{I(s)}{NF^2} - 1\right)\sin s R\, ds$$

is modified to average over the different kinds of atoms to give:

$$4\pi r^2 k_{alloy}\rho_{alloy}(r) = 4\pi r^2 k_{alloy}\rho_{alloy} + \frac{2r}{\pi}\int_0^\infty si(s)\sin(sr)ds$$

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where $k_{alloy} = C_a k_a + \ldots + C_n k_n$, $\rho_{alloy}(r) = \rho_a(r) + \ldots + \rho_n(r)$,

The determination of the atomic radial distribution function in a liquid metal alloy from electronogram data. (Cont.)

c_m = atomic concentration in the alloy, N = total number of scattering atoms, $k_m = F_m/f_e$ the effective number of scattering electrons in an atom of m, $f^2 = (Z-F)^2/s^2$, $s = 4\pi\sin\theta/\lambda$, $f_e = \Sigma\left(\sum F_m / \sum Z_m\right)$ and $i(s) = \left[I'(s) - \sum F_m^2\right]/f_e^2$.

The above formula was applied to data obtained photometrically from electronograms taken of a layer of 60% Al, 40% Sn 3 x 10^{-6} cm thick at 520 C. The layer was produced by vacuum evaporation. The density curve showed three maxima corresponding to Al-Al distances of 2.70 A (10.0 neighbours), Sn-Sn distances of 3.40 A (6.2 neighbours) and Al-Sn + Sn-Al distances of 3.05A with 1.0 and 1.5 to 1.6 neighbours, respectively. There are 9 references, 8 of which are Slavic, 1 figure and 1 table.

Card 2/2

ASSOCIATION: Kharkov State University im. A.M. Gorkogo (Kharkovskiy Gosudarstvennyy Universitet im. A.M. Gorkogo)

SUBMITTED: October 3, 1956.
AVAILABLE: Library of Congress.

BUBLIK, A.I.

AUTHORS: Bublik, A. I. and Buntar', A. G. 126-1-8/40

TITLE: Determination of the density of the distribution of atoms in liquid aluminium and bismuth at various temperatures from data of electron diffraction patterns. (Opredeleniye plotnosti raspredeleniya atomov v zhidkikh Al i Bi pri razlichnykh temperaturakh po dannym elektronogramm).

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vo 5, No.1, pp. 53-57 (USSR)

ABSTRACT: In an earlier paper (Ref.1) data are given on the study of the structure of liquid tin by means of electron diffraction patterns at two temperatures, namely, at the melting point temperature and at 300°C. On the basis of analysis of the curves of the density of atom distribution, it is shown that the structure of liquid tin changes with increasing temperature. At the melting point temperature, the distribution of the atoms is basically the same as in crystalline tin; with increasing temperature the liquid tin aims to attain a dense packing. The authors considered it of interest to verify this characteristic also on other metals and in this paper the results are given of electron diffraction investigation of the structure of liquid aluminium which, in the solid state,

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Determination of the density of the distribution of atoms in liquid aluminium and bismuth at various temperatures from data of electron diffraction patterns.

has a densely packed lattice and of Bi which has a rhombohedric lattice approaching the simple cubic lattice. The preparation of the specimens, the taking of the electron diffraction exposures and the calculations were carried out in the same way as in the earlier work. Electron diffraction exposures were made for aluminium films of the thicknesses $2 \cdot 10^{-6}$ to $3 \cdot 10^{-6}$ cm at the temperatures 670, 720 and 850°C and for Bi films of equal thicknesses at 280, 300 and 400°C; the I(s) curves for various temperatures are entered in the graphs Figs. 1 and 2 and the positions of the maxima of these curves are entered in Table 1, p.54. The radial distribution density of the atoms is graphed in Fig.3 for aluminium (for 670, 720 and 850°C) and in Fig.4 for bismuth (for 200, 300 and 400°C). The number of near neighbours at various temperatures were determined for liquid aluminium and bismuth. It was found that at the melting point temperature the short range order is fundamentally the same as in crystalline aluminium and with increasing temperature the density of the particles decreases; the short range order in bismuth at a

Determination of the density of the distribution of atoms in liquid aluminium and bismuth at various temperatures from data of electron diffraction patterns.

temperature approaching the crystallisation temperature is also similar to the order of distribution of the particles in solid bismuth, whilst with increasing temperature (up to 300°C), the bismuth tends to become more densely packed in the same way as was observed in earlier work for tin; in the case of considerable overheating, the density of the atom distribution in aluminium as well as in bismuth approaches the average density.

Acknowledgment is made to Professor B. Ya. Pines for his advice during the execution of the work.

There are 4 figures, 2 tables and 6 references, three of which are Slavic.

SUBMITTED: July 16, 1956.

ASSOCIATION: Khar'kov State University. (Khar'kovskiy Gosudarstvennyy Universitet).

AVAILABLE: Library of Congress.

AUTHORS: Bublik, A.I. and Buntar', A.G. SOV/70-3-1-6/26

TITLE: Electron Diffraction Study of the Structure of Liquid Metals and Alloys (Elektronograficheskoye issledovaniye stroyeniya zhidkikh metallov i splavov)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 1, pp 32 - 42 (USSR)

ABSTRACT: This is an abridged version of a paper read at the first All-Union conference on electron diffraction in January, 1957. Some years ago in the laboratory of the department of solid-state physics of the Khar'kovskiy gosudarstvennyy universitet (Khar'kov State University) a method was developed for electron diffraction studies of liquids (Refs 6, 7) and systematic work was begun on the structure of liquid metals and alloys. Up to that time, electron diffraction technique was almost never used in structural analysis of liquids. There are only two papers (Ref 8) in which electronograms are reported for a few liquid metals and alloys. In the method now described the structure of liquid metals and alloys was studied, using electronograms obtained with "free" liquid films with a thickness of between 10^{-5} and 10^{-6} cm. The method of preparation of polycrystalline unbacked films was described

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earlier (Ref 9). Such films are obtained by evaporation onto a glass or mica plate in such a way that first a soluble (in water) film of some material is deposited and then the metal itself. When such a plate is placed in a solvent the metallic film can easily be separated from the backing and floats freely on the surface of the solvent. Such a film can then be easily removed and placed in a special holder for use in a high-temperature electronograph. The electronograph in the above department is very simple(Ref 6). Its main advantage is that structural studies can be carried out at high temperatures. However, in high-temperature work very careful preparation of specimens is necessary and it must be ensured that the heating device does not out-gas. Figure 1 shows a device which acts both as a heater and specimen holder. The device is in the form of a tantalum plate with an aperture in the middle upon which the specimen is placed. The tantalum ribbon is fixed in a holder whose ends are insulated from the body. In Figure 1 (7) is the tantalum ribbon on which the specimen is placed. By passing a current through the tantalum ribbon the specimen can be

Electron Diffraction Study of the Structure of Liquid Metals and Alloys

heated to any temperature and changes in its structure can be followed either on a screen or by photographic means. Integral analysis of intensity curves was used to determine the degree of short-distance order. This method was described by the present authors in Refs 7 and 11 for liquid metals and Refs 12 and 13 in the case of alloys. To calculate the radial distribution in monatomic liquids, Formula (1) was used. To determine the corresponding function in the case of liquid alloys Eq (5) was used. Figures 2-6 show the radial distributions at various temperatures in liquid Bi, Al, Sn and In. The temperature range covered is 235 - 850 °C. The following conclusions can be drawn from these results: 1) liquid metals (independently of the type of the crystal lattice) have the same short-distance order as the crystalline state at the melting point; 2) in the case of metals with dense packing, the co-ordination number decreases with increasing temperature and in the case of "loose" packing this number increases; 3) at high temperatures the distribution density in all liquid metals tends to a smooth curve.

SOV/70-3-1-6/26

Electron Diffraction Study of the Structure of Liquid Metals and Alloys

The following alloys were investigated: Bi-Sn, Al-Sn, and Al-In. The radial distribution curves for these alloys at various temperatures and compositions are given by Figures 9-14. Results obtained for these alloys show that thin films of liquid alloys (of any concentration) consist, at temperatures close to the crystallisation point, of regions enriched with one of the components. The character of the packing in these "uniform" regions is very similar to the packing in the corresponding pure liquid metals.
There are 14 figures, 5 tables and 18 references, 3 of which are German, 1 English and 14 Soviet.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A.M. Gor'kogo (Khar'kov State University imeni A.M. Gor'kiy)

SUBMITTED: February 26, 1957

Card 4/4

AUTHOR: Bublik, A.I., Buntar', A.G. SOV/126-6-4-18/34

TITLE: Electron-Diffraction Study of the Structure of Liquid Alloys in the Al-Sn System (Elektronograficheskoye issledovaniye stroyeniya zhidkikh splavov sistemy Al-Sn)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 4, pp 692-699 (USSR)

ABSTRACT: In contrast to liquid metals, the structure of molten metal alloys has not been studied in great detail. One of the first papers on this subject was written by Danilov and Radchenko(Ref.1), followed later by the work of Skrishevskiy (Ref.2). The present authors suggested (Refs.3-5) that electron diffraction was a useful technique in the study of the structure of liquid metal alloys. A method of calculation on the radial distribution of the density of atoms in a liquid alloy from electron diffraction intensities was given in Ref.5. The present paper gives the results of electron-diffraction study of the structure of liquid Al-Sn alloys of the following compositions: 80% Al, 20% Sn; 60% Al, 40% Sn; 40% Al, 60% Sn; 20% Al, 80% Sn;

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Electron-Diffraction Study of the Structure of Liquid Alloys in the Al-Sn System

(all in atomic %). Each alloy was studied at several temperatures ranging from the neighbourhood of its melting point to about 150°C above it. The alloys were in the form of thin films (3×10^{-6} cm) prepared by evaporation and condensation in vacuo. The composition of an alloy was determined by weighing. The samples were melted and electron-diffraction patterns were obtained in the high-temperature apparatus described by Pines and Bublik (Ref.7). From the diffraction patterns intensity curves were constructed, e.g. Fig.1 which gives the intensities for the alloy with 80% Al at 600°C (curve 1), 700°C (curve 2), 750°C (curve 3). Positions of the maxima on the intensity curves of all the alloys studied are given in Table 1. From the intensity curves the distributions of atoms in the four alloys were derived (Figs.2-5). The authors make the following deductions from the data of Figs.2-5. At temperatures just above the melting point, liquid Al-Sn alloys possess regions consisting mainly of atoms of one kind (e.g.Al);

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this agrees well with the X-ray diffraction studies of liquid alloys reported by Danilov, Radchenko and Skrishevskiy (Refs. 1-2). Coordination numbers calculated for all the four alloys (Table 2, Fig.6-7) show that the packing in the regions consisting of atoms of one kind is similar to the packing in the corresponding pure metals. With increase of temperature a gradual mixing of atoms occurs and the distribution of the two components becomes more uniform. It is pointed out that the studies reported in the present paper were made on films 3×10^{-6} cm thick and, therefore, the results obtained may not apply to liquid alloys in bulk. Acknowledgments are made to Professor B.Ya.Pines for his advice. There are 7 figures, 2 tables and 9 references of which

SOV/126-6-4-18/34

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8 are Soviet and 1 German.

ASSOCIATION: Khar'kovskiy Gosudarstvennyy Universitet imeni A.M.Gor'kogo (Khar'kov State University imeni A.M.Gor'kiy)

SUBMITTED: 8th February 1957.

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SOV/81-59-13-45213

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 13, p 71 (USSR)

AUTHORS: Bublik, A.I., Buntar', A.G., Gayevaya, N.P.

TITLE: The Investigation of the Structure of Liquid Alloys of the Bi-Sn System by the Electronographic Method

PERIODICAL: Uch. zap. Khar'kovsk. un-t, 1958, Vol 98, Tr. Fiz. otd. fiz.-matem. fak., Vol 7, pp 251 - 256

ABSTRACT: The scattering of electrons by liquid Bi-Sn alloys has been investigated (for alloys with 20, 50, and 80 atomic % Bi at temperatures close to the crystallization point, and for the alloy with 50% Bi also at 270°C). The samples were prepared in the form of "free" films $(2 - 3)\cdot10^{-6}$ cm thick by evaporation and condensation in vacuum. The scattering intensity curves of all alloys, a little overheated above the melting point, agree well with the calculated ones obtained from the intensity curves for pure components by the law of additivity. In the case of overheating by several dozens of degrees above the liquidus there is no such agreement. Based on the intensity curves of scattering the curves of the radial distribution of atoms in the alloy with 50% Bi have been calculated. The numbers of the adjacent

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The Investigation of the Structure of Liquid Alloys of the Bi-Sn System by the Electronographic Method

neighbors and the coordination number have been determined approximately. The conclusion is drawn that liquid films of Bi-Sn alloys of any concentration at the melting point consist of regions, in which mainly atoms of one type are found. At overheating by several dozens of degrees this microstratification disappears.

D. Belashchenko

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BUBLIK, Andrey Ivanovich [Bublyk, A.I.]; KRASNITSKIY, Mikhail Sergeyevich [Krasnyts'kyi, M.S.]; BOROVSKIY, Eduard Rudol'fovich [Borovs'kyi, E.R.]; KIYANICHENKO, N.S. [Kyianichenko, N.S.], red.; LEUSHCHENKO, N.L., tekhn. red.

[Use of glass pipes in the water piping in farm buildings] Sil's'kyi vnutrishnii vodoprovid iz sklianykh trub. Kyiv, Derzhbudvydav URSR, 1963. 30 p. (MIRA 17:1)

BYBLIK, A., gvardii polkovnik, voyennyy shturman vtorogo klassa

Before you make a decision... Av. i kosm. 47 no.7:6-9 Jl '65.
(MIRA 18:6)

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S/020/60/131/04/02/073

16.5600

AUTHOR: Bublik, B.A.

TITLE: On the Existence of Non-Rigid Closed Surfaces 16

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol.131, No.4, pp 725-727.

TEXT: Continuing the investigations of N.N.Yefimov (Ref.3) and E.G.Poznyak (Ref.4) and of the own paper (Ref.5) the author constructs the example of a non-rigid regular closed surface with not less than two linearly independent infinitesimal bendings.
The author mentions L.V.Kantorovich.
There are 6 Soviet references.

ASSOCIATION: Magnitogorskiy gosudarstvennyy pedagogicheskiy institut (Magnitogorsk State Pedagogical Institute)
PRESENTED: December 1, 1959, by P.S.Aleksandrov, Academician
SUBMITTED: November 20, 1959

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BUBLIK, B. A.

Cand Phys-Math Sci - (diss) "Occurrence of closed surfaces of rotation accessible to not less than two linearly independent infinitely small bendings." Moscow, 1961. 7 pp; (Moscow Order of Lenin and Order of Labor Red Banner State University imeni M. V. Lomonosov) Mechanics-mathematics faculty); 200 copies; price not given; (KL, 5-61 sup, 172)

BUBLIK, B.A.

Number of fundamental infinitesimal deformations of closed finned surfaces of revolution. Usp. mat. nauk 18 no.2:121-125 Mr-Ap '63. (MIRA 16:8)

(Surfaces, Deformation of)

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C111/C222

AUTHORS: Bublik, B.N., and Merkulov, V.I. (Kiyev)

TITLE: On the Dynamic Stability of Thin Elastic Shells Filled up With a Fluid

PERIODICAL: Prikladnaya matematika i mekhanika, 1960, Vol.24, No.5, pp.941-946

TEXT: The authors consider a thin elastic shell the inner cavity of which is entirely or partially filled with an ideal incompressible fluid. The question for the dynamic stability leads to the solution of the variation problem

$$\delta \int_{t_o}^{t} (T''-A''-U'')dt = 0, \tag{1.1}$$

where T'' and U'' are the kinetic and the potential energy of the disturbed system, while A'' is the work of a certain reduced load on the shifts of the disturbance and is defined as in (Ref.2). If the inertia terms can be neglected or if the initial state of the shell is almost free of moments it holds

$$A'' = \frac{1}{2} \iint_{\Sigma} \left[F_{\alpha} u + F_{\beta} v + F_n w\right] d\sigma, \tag{1.5}$$

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where

$$F_\rho = \frac{1}{PQ}\left[\frac{\partial}{\partial\beta}(\varepsilon_1 PT_2^0) - T_1^0\frac{\partial}{\partial\beta}(\varepsilon, P) + \frac{\partial}{\partial\alpha}(\varepsilon_2 PS^0) + S^0\frac{\partial}{\partial\alpha}(\varepsilon_2 Q) - q_\beta(\varepsilon_1+\varepsilon_2)\right]$$

(1.4)

$$F_n = T_1^0\varkappa_1 + T_2^0\varkappa_2$$

$$F = \frac{1}{PQ}\left[\frac{\partial}{\partial\alpha}(\varepsilon_2 QT_1^0) - T_2^0\frac{\partial}{\partial\alpha}(\varepsilon_2 Q) + \frac{\partial}{\partial\beta}(\varepsilon_1 QS^0) + S^0\frac{\partial}{\partial\beta}(\varepsilon_1 P) - q_\alpha(\varepsilon_1+\varepsilon_2)\right.$$

Here and lateron Σ is the middle surface; α,β are its curvilinear coordinates; n is its normal; P and Q are the coefficients of its first fundamental form; u,v,w are shifts corresponding to α,β,n; m_0 and ζ are mass densities of the surface of the shell and the volume of the fluid; ε_1, ε_2, ω, $\varkappa_1$, $\varkappa_2$, τ are relative deformations of the shell expressed by u,v,w according to the linear theory of shells; T_1^0, T_2^0, S^0 are stresses of the undisturbed shell by which the initial state free of moments is characterized; q_α, q_β, q_n are the outer loads; a is the acceleration of the

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On the Dynamic Stability of Thin Elastic Shells Filled up With a Fluid

translation of motion of the system; V is the volume of the fluid, φ is the velocity potential of the fluid in V; Σ_1 is the part of the boundary of V where $\frac{\partial \varphi}{\partial n}$ is known; Σ_2 is the part of the boundary of V where φ is known; G is the Green's function of the Neumann-Dirichlet problem for the Laplace equation in V.
It holds

$$(1.6) \qquad \varphi = \iint_{\Sigma_1} G \frac{\partial \varphi}{\partial n} d\sigma - \iint_{\Sigma_2} \frac{\partial G}{\partial n} \varphi d\sigma .$$

The solution of (1.1) leads to four differential equations

$$(1.7) \qquad L_{11}(u)+L_{12}(v)+L_{13}(w)+ \frac{1-\nu^2}{Eh}\left[F_\alpha - m_0 \frac{\partial^2 u}{\partial t^2}\right] = 0$$

$$L_{21}(u)+L_{22}(v)+L_{23}(w)+ \frac{1-\nu^2}{Eh}\left[F_\beta - m_0 \frac{\partial^2 v}{\partial t^2}\right] = 0$$

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$$L_{31}(u)+L_{32}(v)+L_{33}(w)+\frac{1-\nu^2}{Eh}\left[F_n-m_0\frac{\partial^2 w}{\partial t}-\rho\frac{\partial\varphi}{\partial t}\right]=0$$

$$\Delta\varphi=0.$$

The boundary conditions correspond to the clamping of the boundary of the shell [Abstracter's note: not given] and φ:

(1.8) $\frac{\partial^2\varphi}{\partial t^2}+a\frac{\partial\varphi}{\partial z}=0$ on the free surface $z=0$

(1.9) $\frac{\partial\varphi}{\partial n}=-\frac{\partial w}{\partial t}$ on the wetted inner surface.

The operators L,M,E,N and the vector $X(u,v,w,\varphi)$ can be introduced so that (1.7) assumes the form

(2.1) $LX+MX+E\frac{\partial^2 X}{\partial t^2}+N\frac{\partial X}{\partial t}=0$.

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Here L,M,E,N satisfy all conditions for the existence and uniqueness of a generalized solution according to the theorem 3 of Vishik (Ref.6). As an application of the described theory the authors consider a circular cylindrical shell filled with a fluid, with a flexibly clamped boundary. The investigation leads to a system of Hill's equations the investigation of which yields the eigenfrequencies and kinetic forces for the system shell + fluid. If especially the shell is filled completely with a fluid then the question for the stability for arbitrary shell parameter and loads can be answered with the aid of the stability diagram for the appearing Hill's equations.

The authors thank N.N.Moiseyev for the theme and advices. There are 6 Soviet references.

[Abstracter's note: (Ref.2) concerns V.V.Bolotin, Dynamic Stability of Elastic Systems, 1956. (Ref.6) concerns a paper of M.I.Vishik in Doklady Akademii nauk SSSR, Vol.100, No.3]

SUBMITTED: November 25, 1959

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